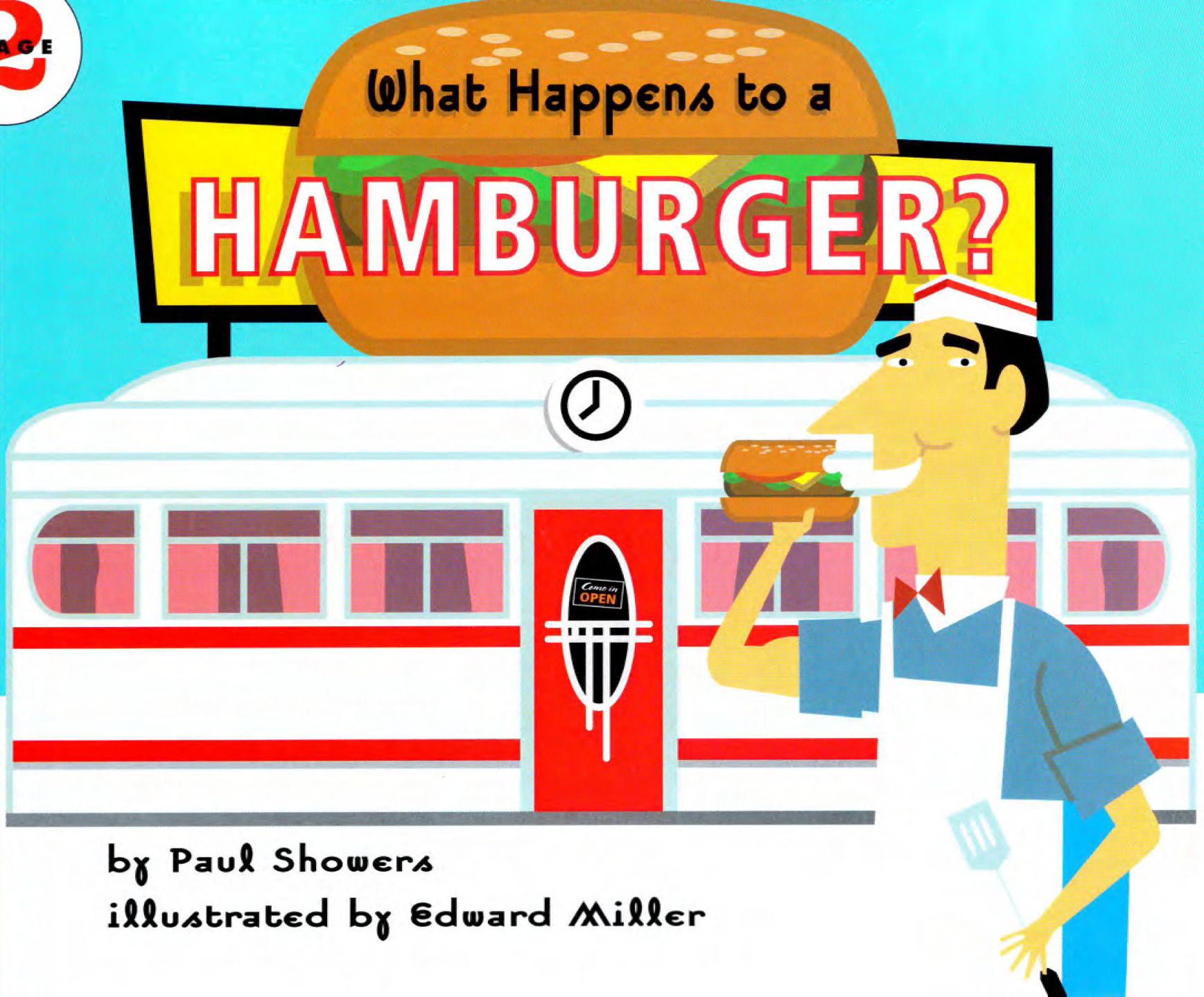
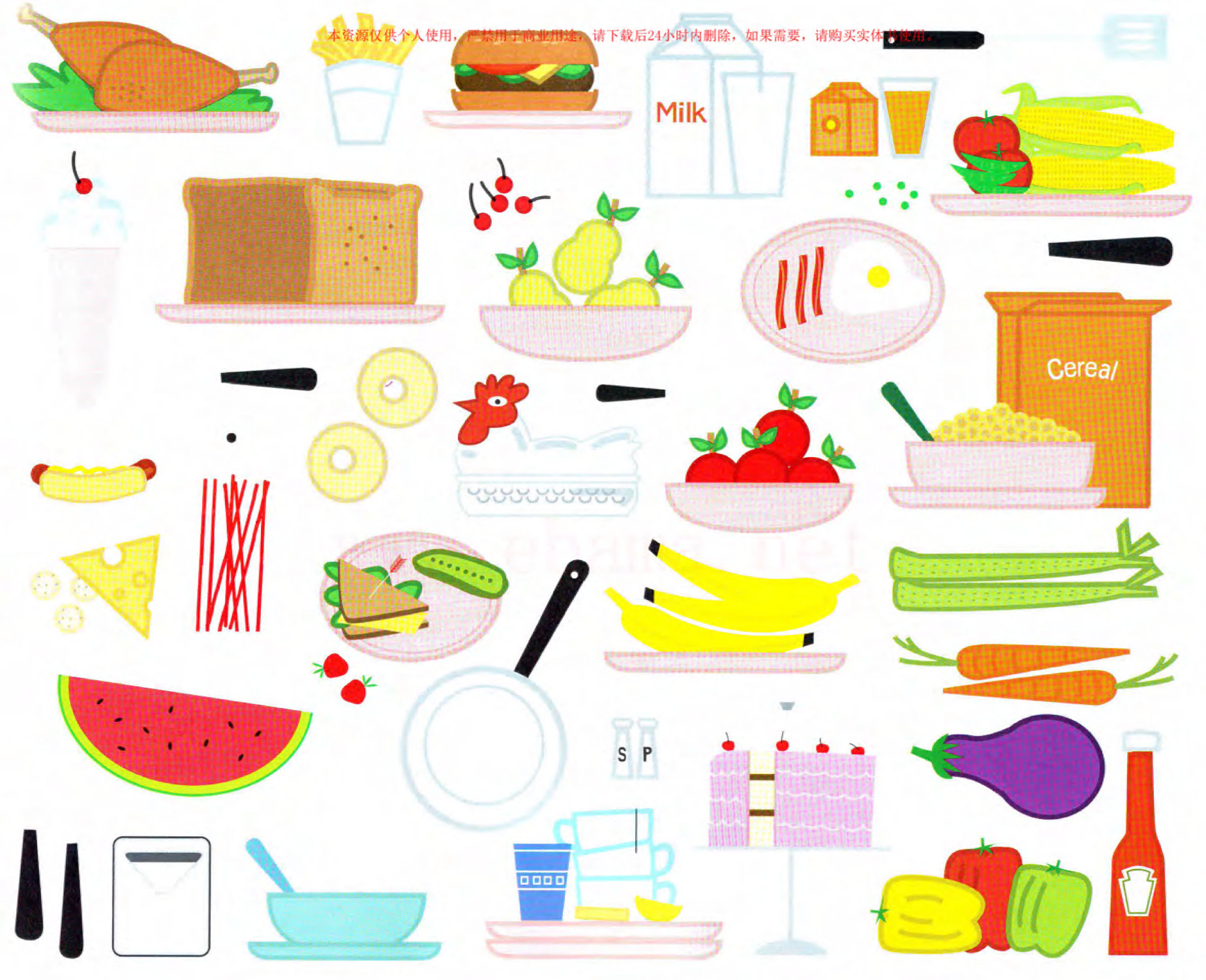
STAGE 2

LET'S-READ-AND-FIND-OUT SCIENCE®

What Happens to a HAMBURGER?



by Paul Showers
illustrated by Edward Miller



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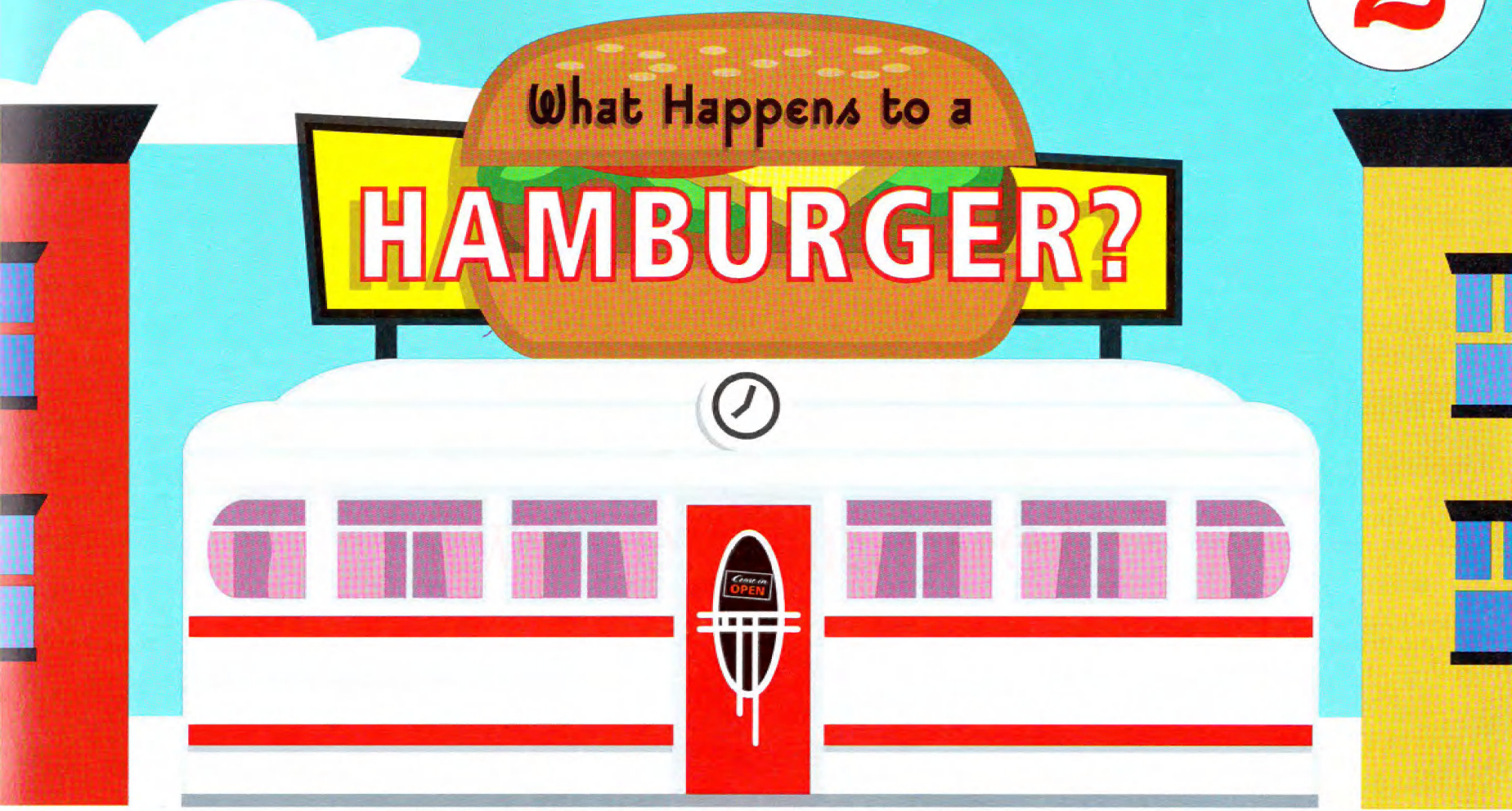

by Paul Showers · illustrated by Edward Miller

HarperCollinsPublishers

To my sister, Irene

—E. M.

Special thanks to Christine Frissora, assistant professor of medicine, the Weill Medical College, Cornell University, for her expert advice.

The art in this book was created using the computer.

The *Let's-Read-and-Find-Out Science* book series was originated by Dr. Franklyn M. Branley, Astronomer Emeritus and former Chairman of the American Museum–Hayden Planetarium, and was formerly co-edited by him and Dr. Roma Gans, Professor Emeritus of Childhood Education, Teachers College, Columbia University. Text and illustrations for each of the books in the series are checked for accuracy by an expert in the relevant field. For more information about Let's-Read-and-Find-Out Science books, write to HarperCollins Children's Books, 1350 Avenue of the Americas, New York, NY 10019, or visit our website at www.letsreadandfindout.com.

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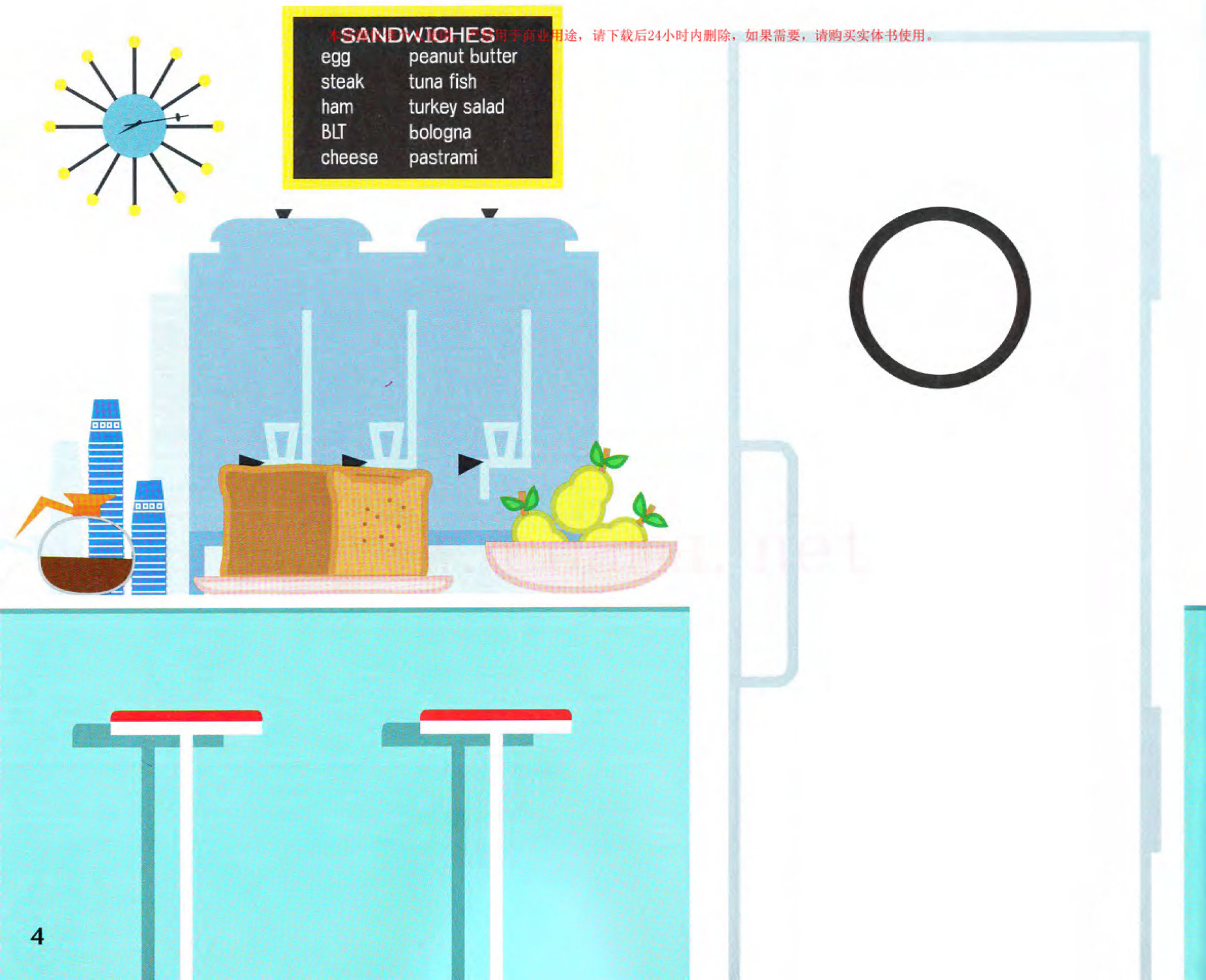


I like to eat.

I like bread and pears and celery. I like carrots and chicken and french fries and hamburgers. I like juice and milk.

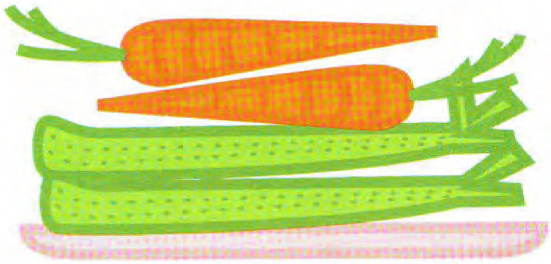
What do you like?

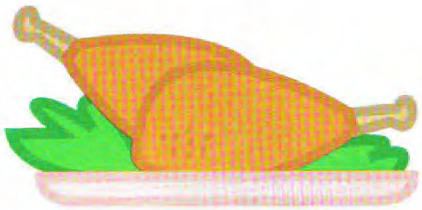
Good food makes you strong and healthy. It gives you energy and helps you grow.

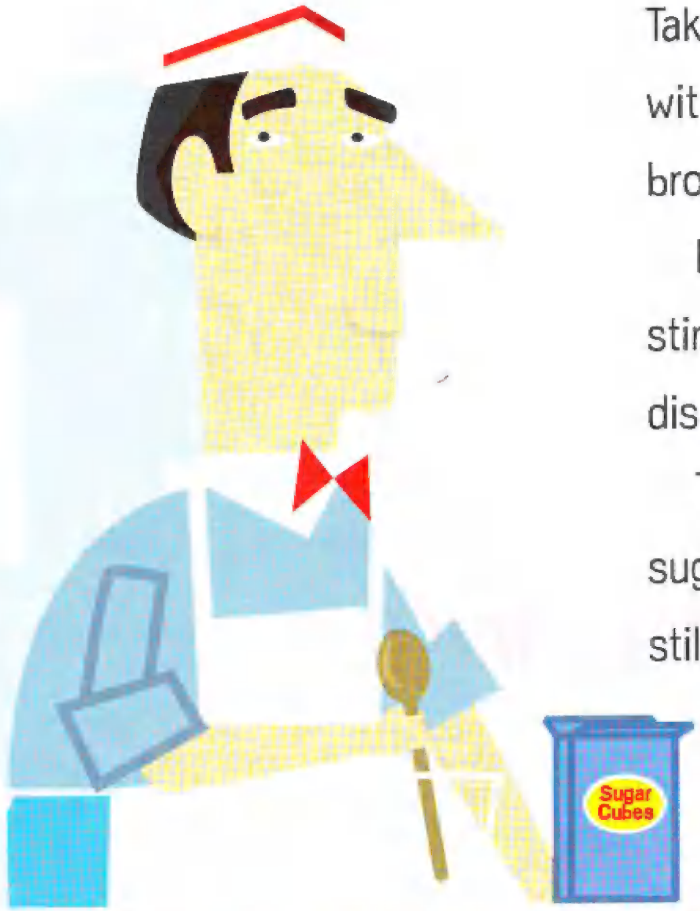
Your body uses food in different ways. It uses some kinds of food to make strong bones and hard teeth. It turns other food into solid muscles. It uses some of the food you eat to keep warm.

Before your body can do these things, it has to change the food. Solid foods like hamburgers and french fries have to be changed into liquids. Liquids like milk and juice have to be changed, too.

When you change the food you eat, you are digesting it.







Put two cubes of sugar into an empty glass. Take a wooden spoon and pound the lumps with the handle. Pound them until they are broken up into powder.

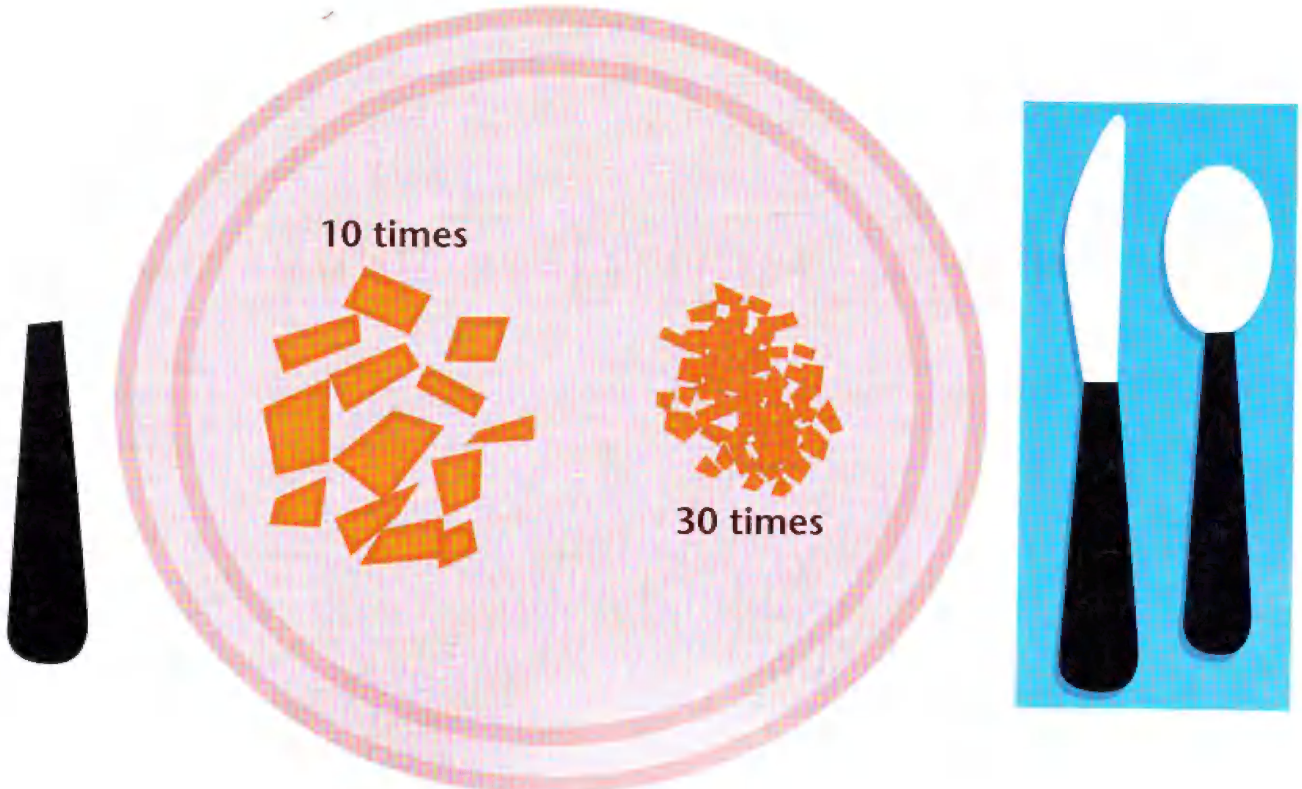
Now pour some water into the glass and stir. Keep stirring until the sugar powder has disappeared.

Take a sip of the water. Can you taste the sugar? The sugar has disappeared, but it is still there. It has broken up into millions of tiny pieces. Your eye cannot see them, but your tongue can taste them.

When you digest your food, you break it up into millions of very tiny pieces. You start to do this as soon as you take a bite to eat. Digestion begins in your mouth when you chew. You break up the food with your teeth.

Get a piece of raw carrot and a plate. Take a bite of carrot and chew it ten times. Spit the carrot out onto one side of the plate. Take another bite. Chew it thirty times. Spit out that mouthful on the other side of the plate. Can you see the difference?

The longer you chew food, the smaller the pieces will be.



Something else helps to break up the food in your mouth. It is a fluid. Many people call it spit. Its scientific name is saliva.

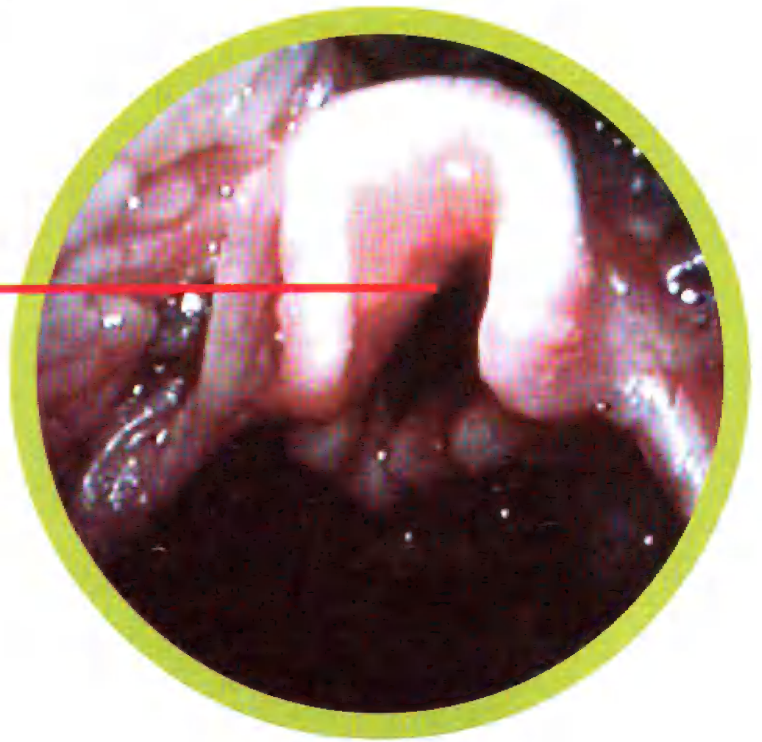
Whenever you take a bite of food, saliva pours into your mouth. You say your mouth is watering. Saliva comes from small glands in your cheeks and under your tongue.

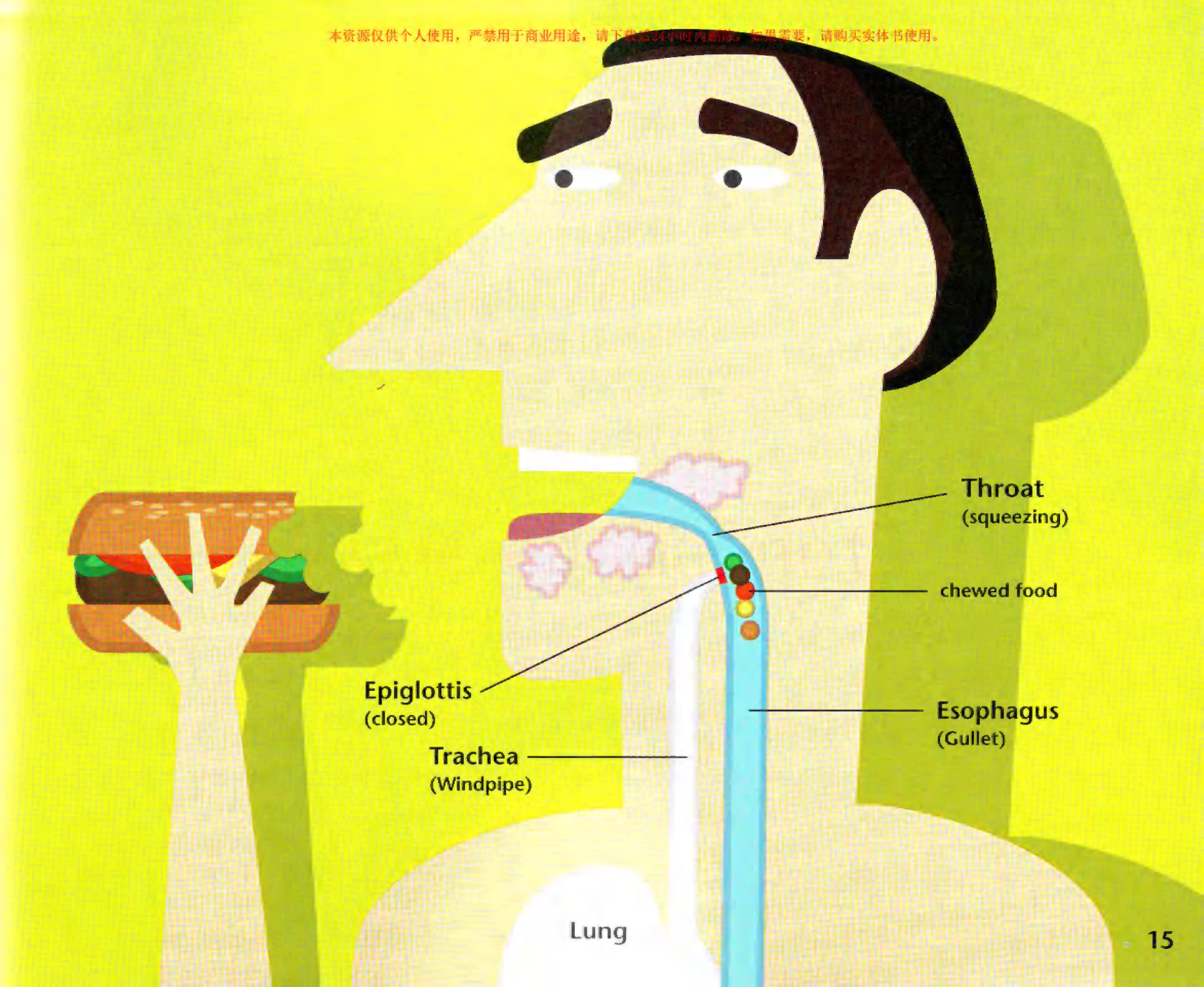
Saliva

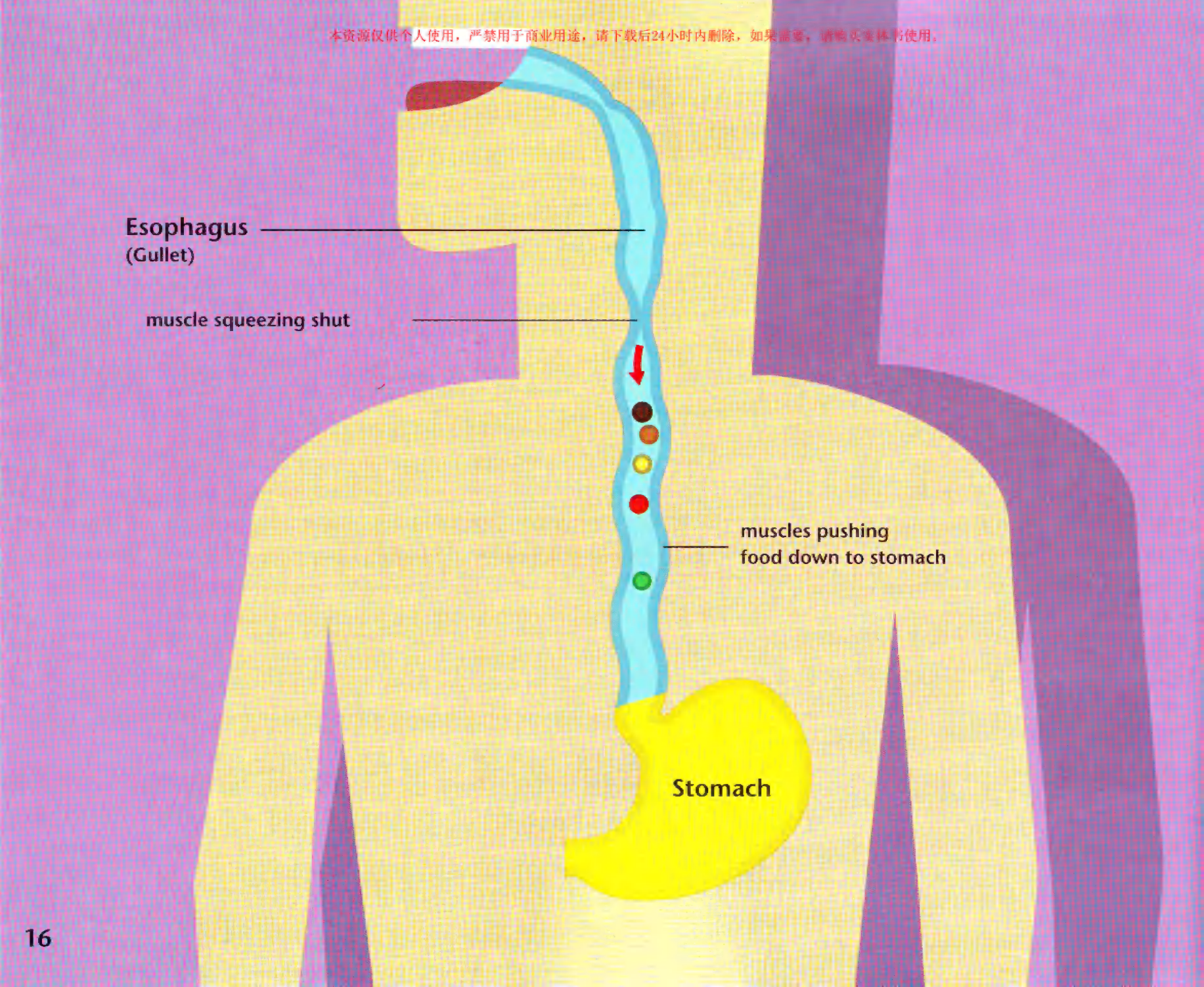
Sometimes saliva pours into your mouth even before you take a bite. The smell of food will start it. Take a good sniff of a brownie. Sniff an open jar of pickles. Now sniff a slice of pizza.

What other kinds of food make your mouth water?

After you have chewed your food, you swallow it. Your epiglottis closes. That is a door that keeps food from going down your trachea (windpipe) and into your lungs. Your throat squeezes together when you swallow. It pushes food down into your esophagus. Another name for esophagus is gullet.







Your gullet is a tube that leads from the back of your mouth to your stomach. There are muscles in your gullet that squeeze together. They push food into your stomach.

Your stomach is a tube like your gullet. But there is a difference. Your stomach can stretch like a balloon. When you eat, your stomach stretches to hold the food.

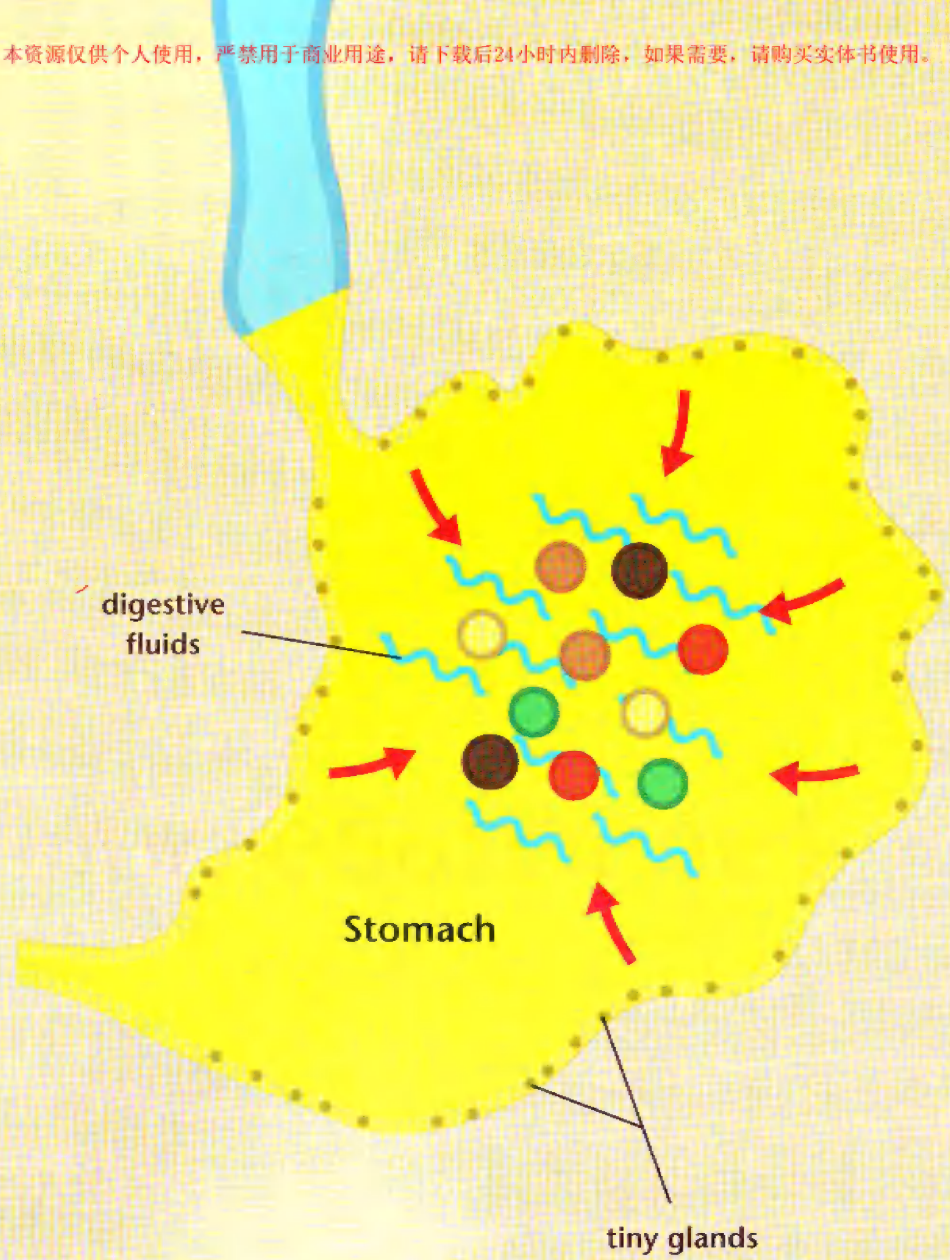
Inside the Stomach

After you swallow your meal, your stomach muscles begin to squeeze. The food is mashed and stirred together.

Your stomach has fluids in it like the saliva in your mouth. They are called digestive fluids. They pour in from tiny glands in the sides of the stomach. The digestive fluids help to break the food up into smaller and smaller pieces.

Food stays in your stomach for several hours. Some kinds of food stay only about two hours. Other kinds stay longer. The food stays until all the lumps have been broken up. It is like a thick soup now. It is made of millions and millions of tiny pieces.

But digestion has just begun. The tiny pieces must be made even smaller. This happens in your intestines.

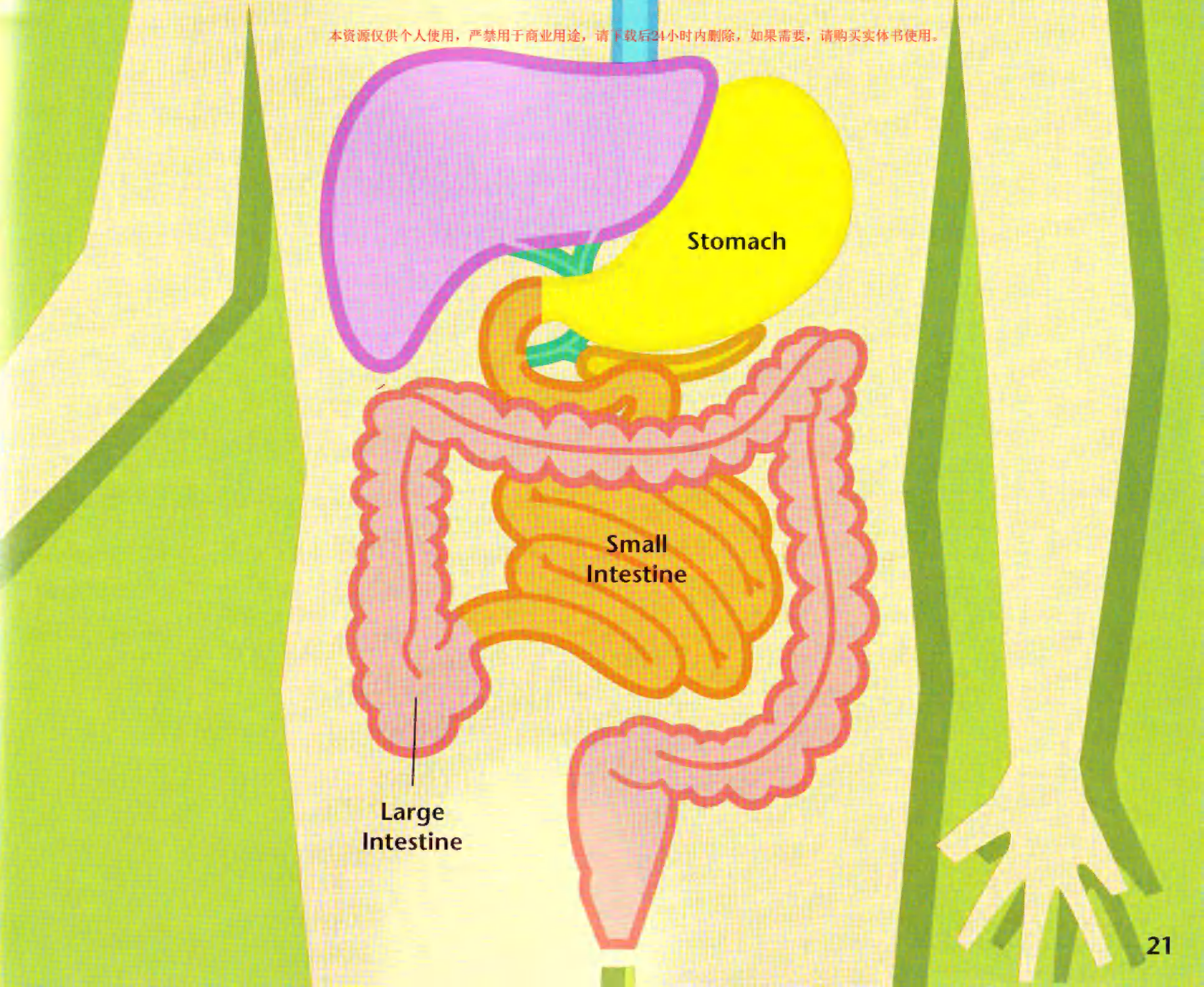


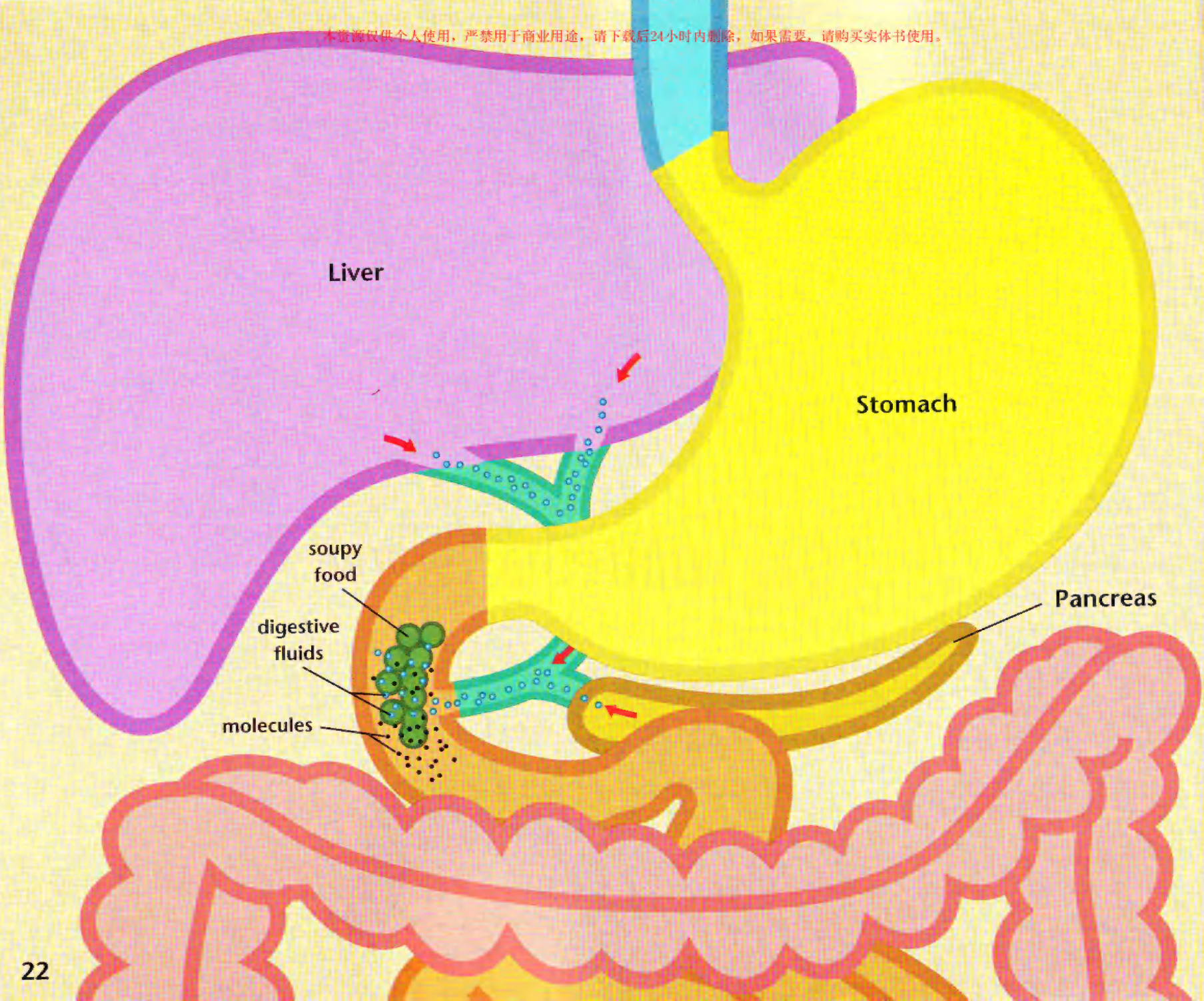
There are two intestines in your body—the small intestine and the large intestine. They are really one single, long tube. This tube is coiled up inside you like a pile of heavy rope. It is about twenty-one feet long.

Most of the tube is narrow and is called the small intestine. The last four or five feet of the tube are much wider. This part is called the large intestine.

Inside the Small Intestine

Inside the Large Intestine

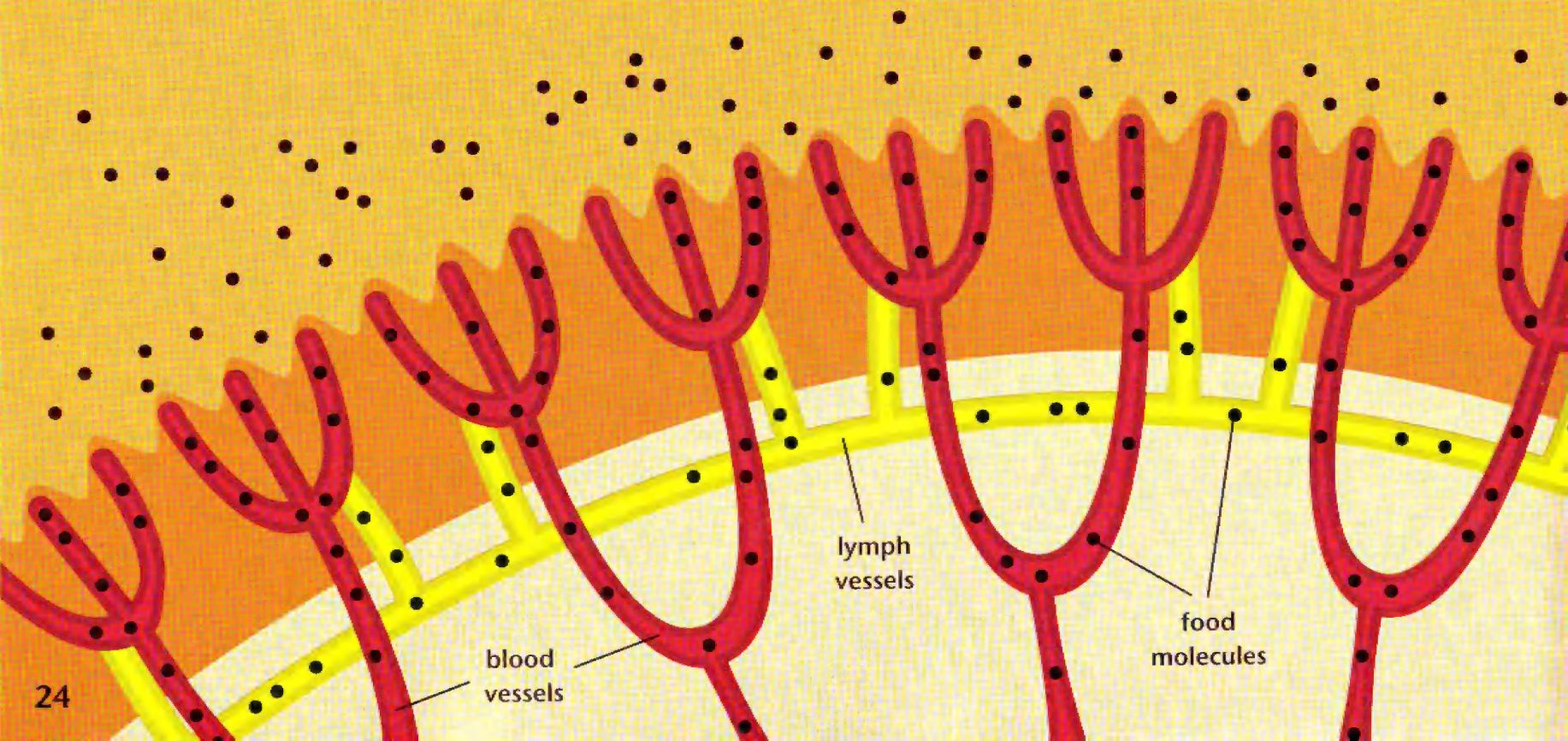


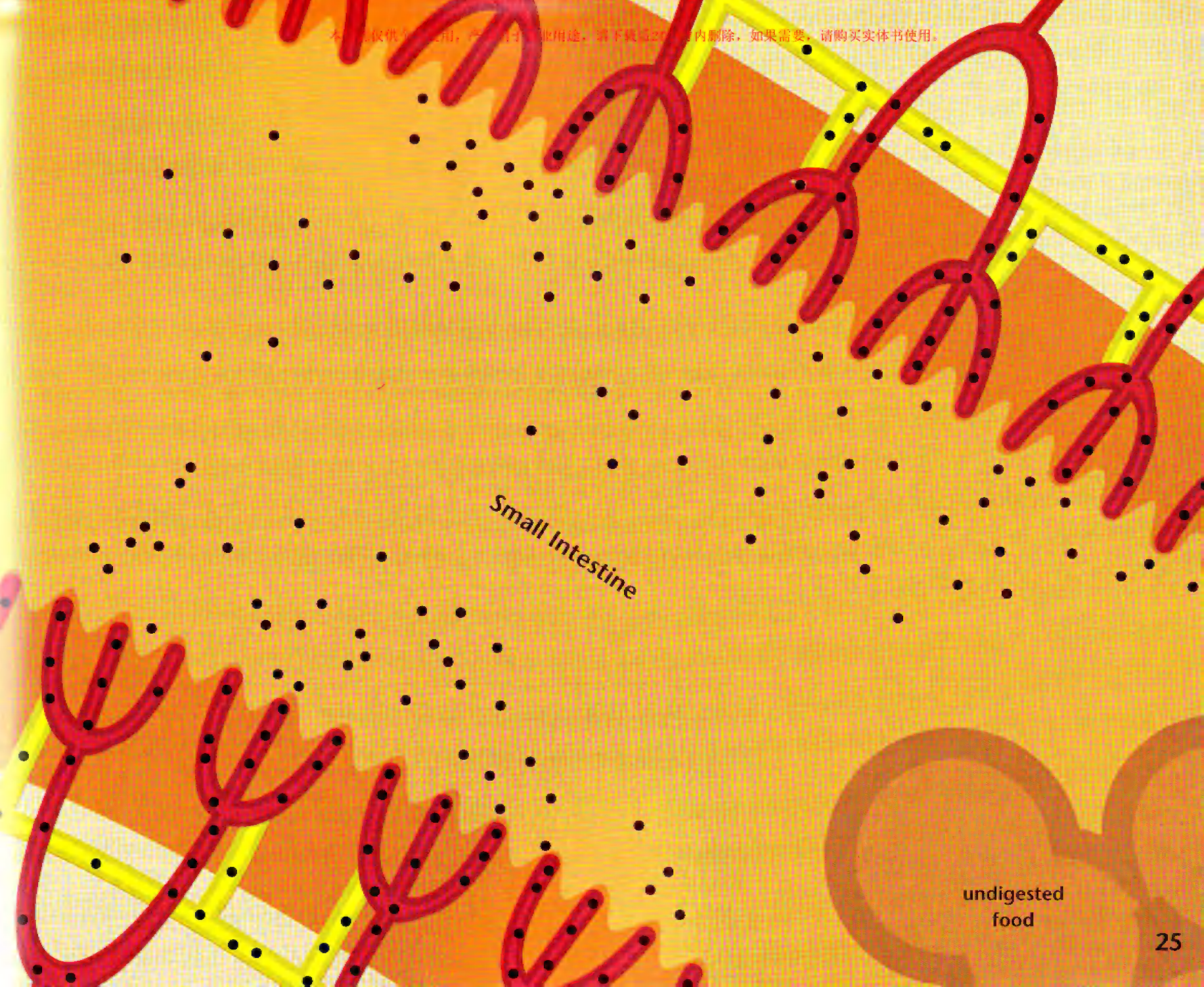


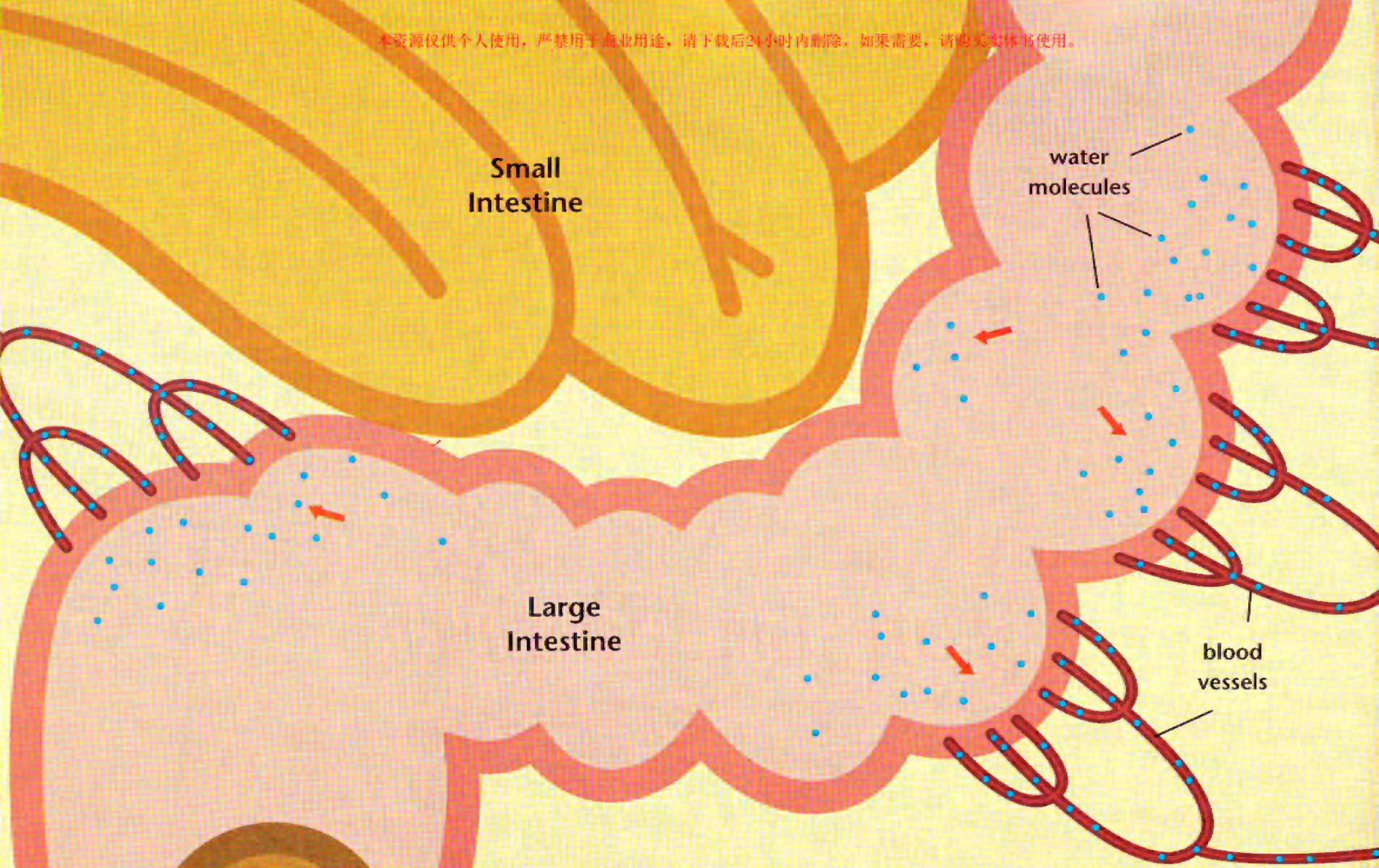
The soupy food is squeezed into the small intestine from the stomach. Digestive fluids from the liver and another organ called the pancreas are mixed with the food in the small intestine. These fluids break the food up into very tiny pieces called molecules. Molecules are so small, you cannot see them without a special microscope.

Groups of Cholesterol Molecules

The food molecules pass into tiny blood vessels and lymph vessels in the walls of the small intestine. They move into your blood. Then your blood carries them to every part of your body.







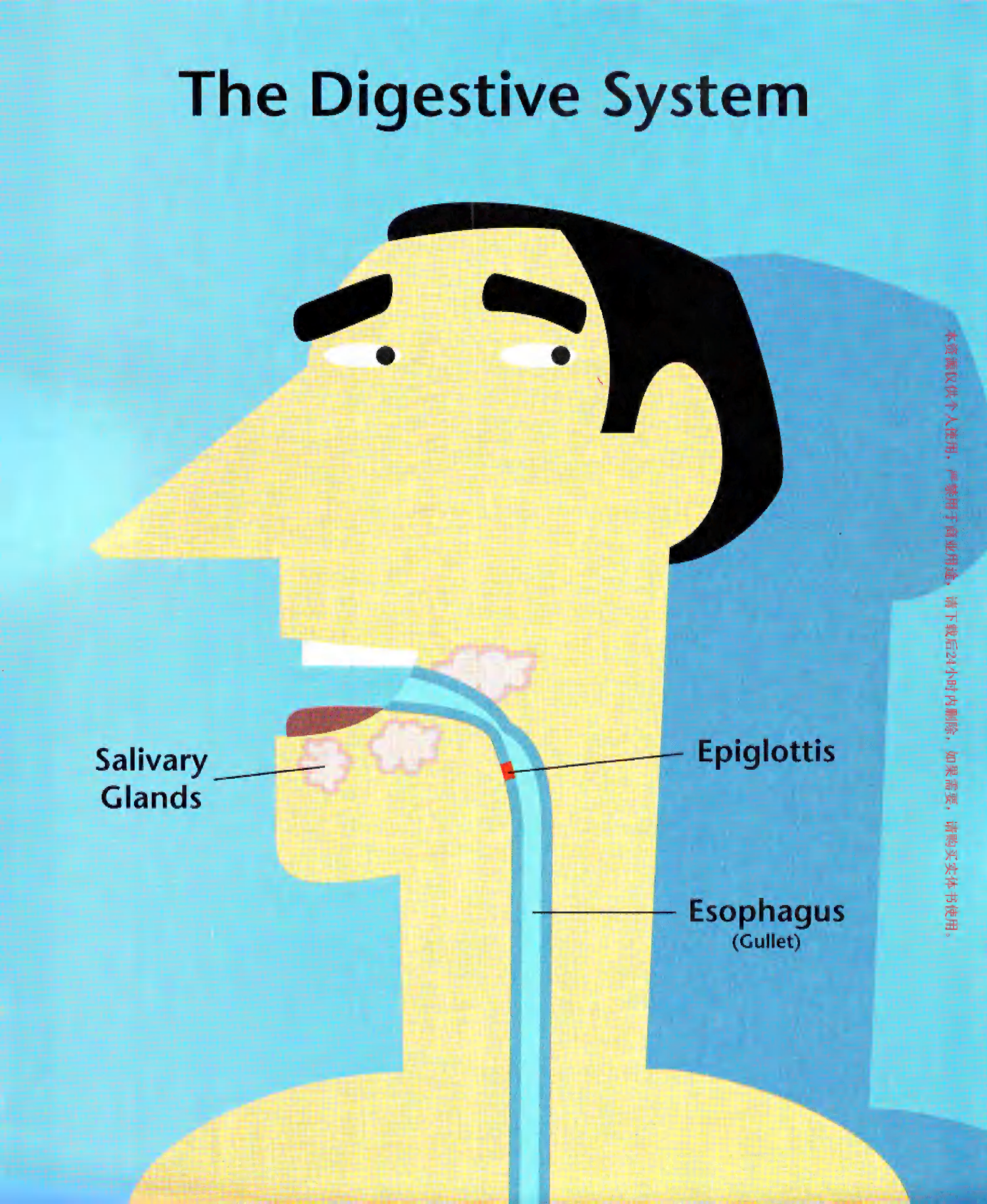
The part of the food that is not digested in the small intestine is squeezed into the large intestine. From here water molecules pass into the bloodstream.

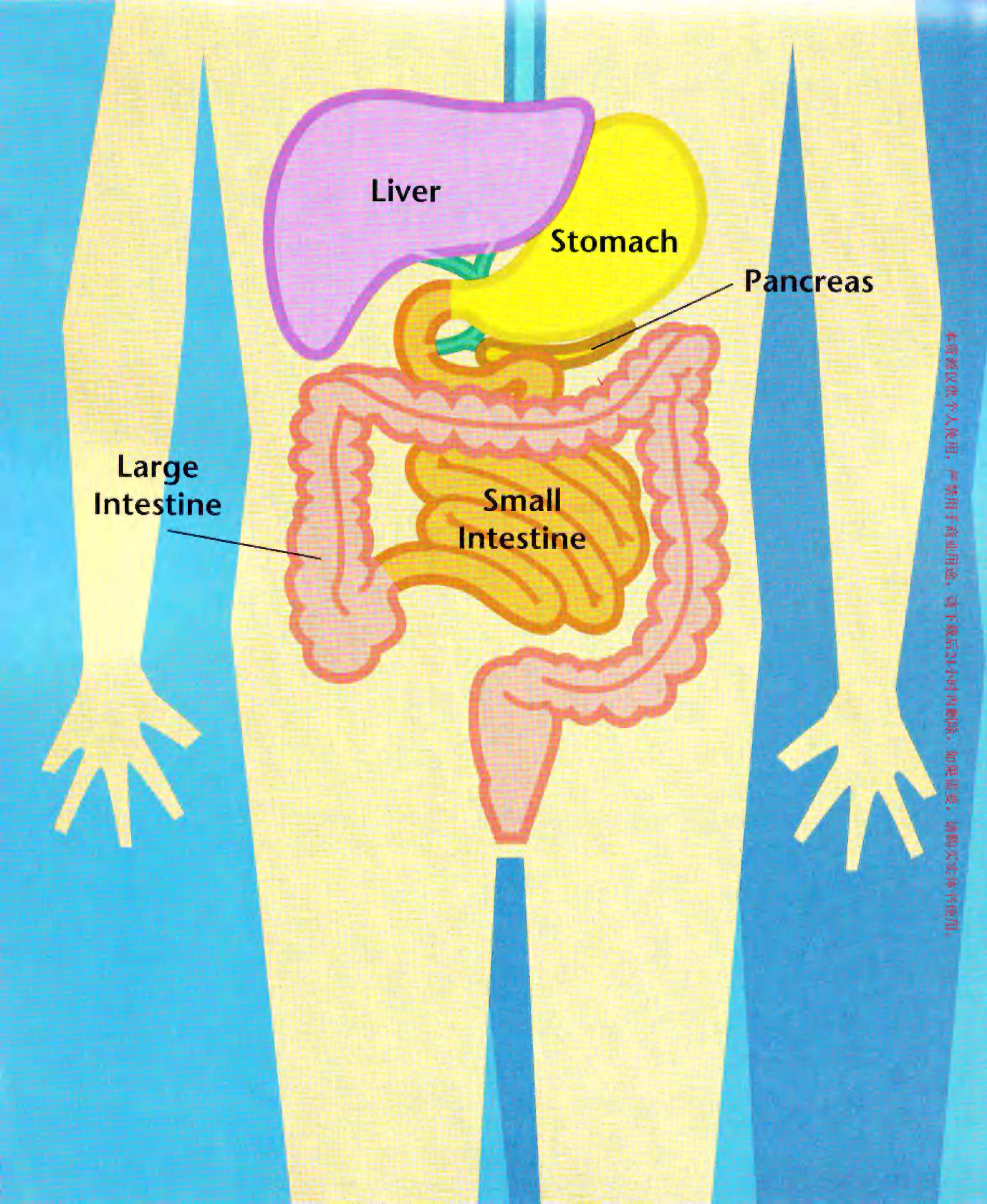
Your body cannot use all of the food you eat. The food it cannot use is stored in the large intestine. You get rid of the unused food when you go to the toilet.

In the morning you may eat scrambled eggs or cereal. You may drink orange juice or milk.

In a few hours, your body has digested the food. Then your blood begins to carry the tiny food molecules—to your muscles to make them stronger . . . to your bones and teeth to make them harder . . . to every part of your body to give you energy and help you grow.

The Digestive System

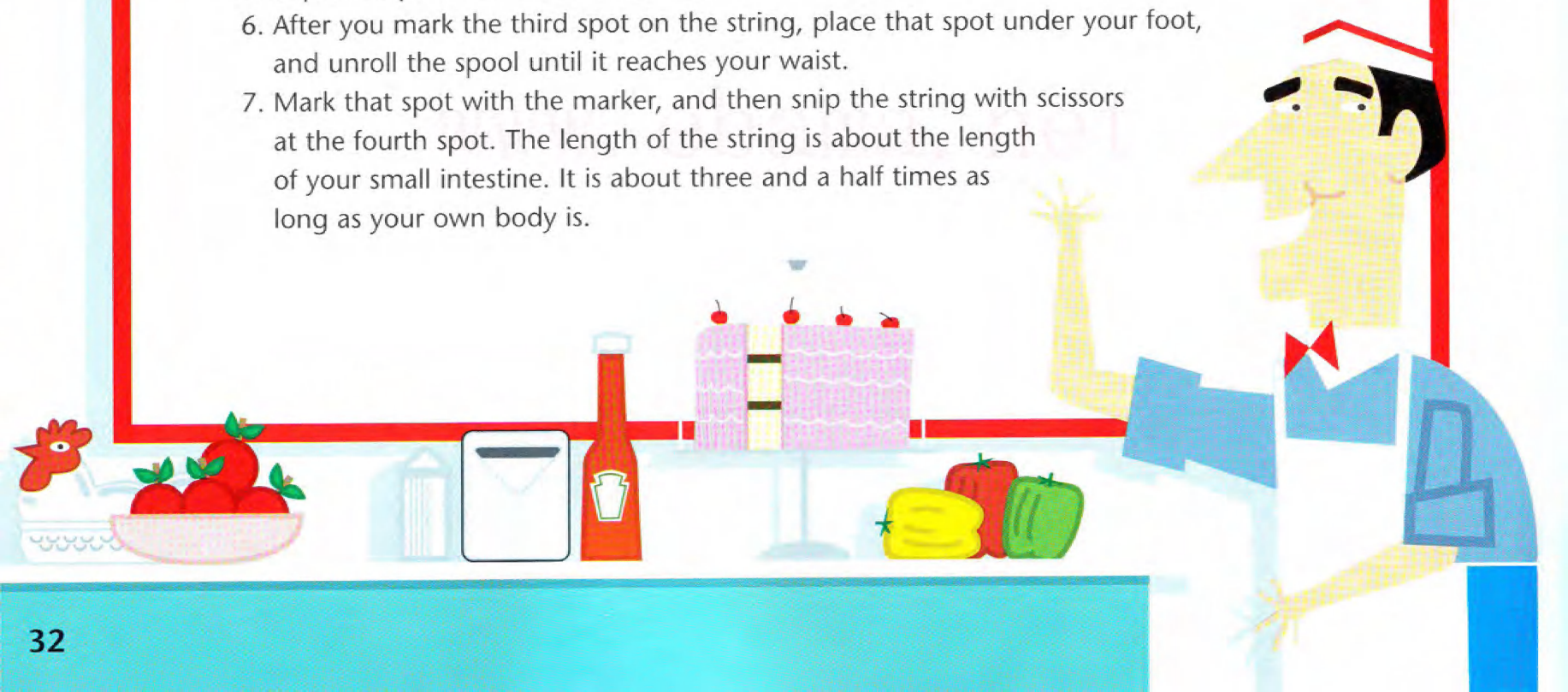




FIND OUT MORE ABOUT DIGESTION

How long is your small intestine?

1. Find a spool of string, a marker, and a pair of scissors.
2. Unroll the spool of string from the bottom of your foot to the top of your head.
3. Mark that spot on the string with a marker.
4. Place the part of the string with the spot under your foot, and unroll the spool until it reaches the top of your head again.
5. Repeat steps 3 and 4 one more time.
6. After you mark the third spot on the string, place that spot under your foot, and unroll the spool until it reaches your waist.
7. Mark that spot with the marker, and then snip the string with scissors at the fourth spot. The length of the string is about the length of your small intestine. It is about three and a half times as long as your own body is.



How do the digestive fluids in your body affect food?

Gather these materials:

2 clear-plastic cups
a marker, pen, or pencil
2 pieces of masking tape
3 spoons
6 spoonfuls of milk
2 spoonfuls of water
2 spoonfuls of lemon juice
plastic wrap
2 rubber bands

1. Label the cups "water" and "lemon" by writing the words on the two pieces of masking tape and then sticking one on the outside of each cup.
2. Put three spoonfuls of milk in each cup.
3. Use a clean spoon to add two spoonfuls of water to the cup labeled "water." Stir.
4. Use a clean spoon to add two spoonfuls of lemon juice to the cup labeled "lemon." Stir.
5. Cover each cup with plastic wrap. Use a rubber band to keep the plastic wrap in place.
6. Wait for about a minute and then look closely at each cup of milk. Write down what you see.
7. Wait two hours and then look closely at each cup of milk again. Write down what you see. You'll notice that the water doesn't change the milk. But the lemon juice separates the milk into a lumpy white mass at the bottom of the cup and a clear liquid at the top. Your stomach contains liquids that act on foods in the same way the lemon juice changes the milk.

A journalist and an author of books for young readers, **Paul Showers** worked for many years on the staff of *The New York Times*. He is the author of THE LISTENING WALK, and his books in the Let's-Read-and-Find-Out Science series include HEAR YOUR HEART, SLEEP IS FOR EVERYONE, LOOK AT YOUR EYES, and YOUR SKIN AND MINE.

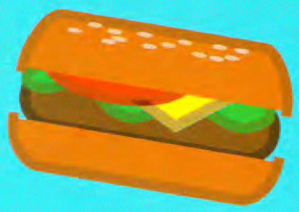
Edward Miller was formerly an associate art director at a major publishing house in New York. He has illustrated several books for children, including INTO THE SKY and CROSS A BRIDGE, and IS THERE LIFE IN OUTER SPACE? by Franklyn M. Branley. Edward Miller lives in New York City.

STAGE 2

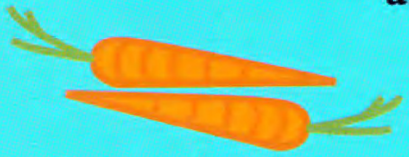
ACTIVITIES INSIDE!

LET'S-READ-AND-FIND-OUT ABOUT

What Happens to a HAMBURGER



What happens to food when you eat it?
Read and find out about your digestive system
and how it turns food into energy your body can use.



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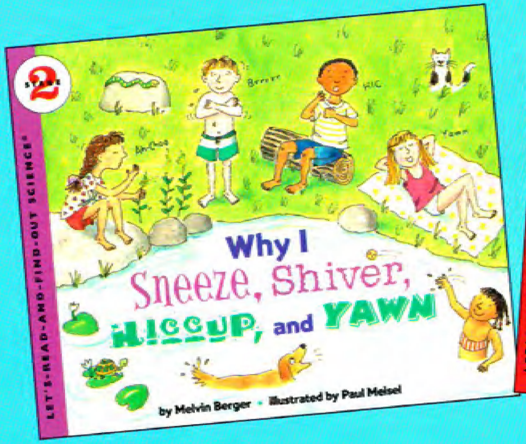

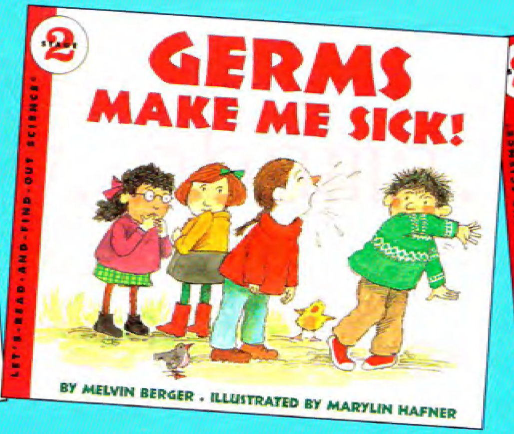

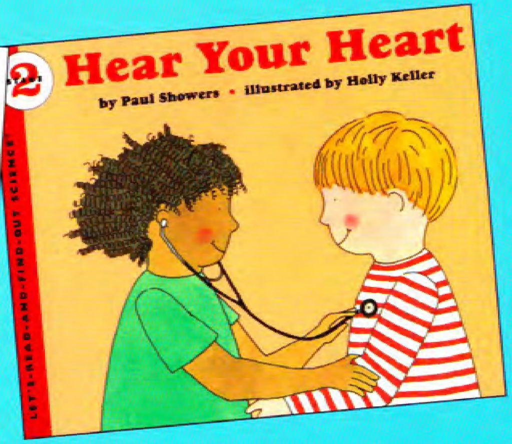

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